

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today
(1) was not written for publication in a law journal and
(2) is not binding precedent of the Board.

Paper No. 30

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte DEWEY POTTER

Appeal No. 1996-1891
Application 08/058,478¹

HEARD: SEPTEMBER 15, 1999

Before KRASS, MARTIN, and GROSS, Administrative Patent Judges.
MARTIN, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 from the
examiner's rejection of claims 1-6, 9, and 10, all of the
pending claims, under 35 U.S.C. §§ 102, 103, and/or 112. We
affirm-in-part and reverse-in-part.

¹ Application for patent filed May 6, 1993.

A. The invention

The invention is an acoustic waveguide loudspeaker system including damping material located in a passage which connects the vibratile surface of the electroacoustical transducer to an opening in the system housing.

B. The claims

Representative claim 1 reads as follows:

1. An acoustic waveguide loudspeaker system comprising:

an electroacoustical transducer having a vibratile surface,

an acoustic waveguide having a first end open and a second end adjacent to said vibratile surface and an effective length corresponding substantially to a quarter wavelength at the lowest frequency of pressure wave energy to be transmitted between said first and second ends,

and damping material in said waveguide near said vibratile surface positioned so as to negligibly attenuate bass frequency energy while of sufficient volume to damp peaks at higher frequencies above the range of said bass frequency energy.

We note this claim does not require that the damping material be located only near the vibratile surface and thus is broad enough to read on a waveguide having damping material located near to and far from the vibratile surface, e.g., a waveguide having damping material along its the entire length.

Appeal No. 1996-1891
Application 08/058,478

C. The references and the rejections

The references relied on in the Answer are:

Bose et al. (Bose)	4,628,528	Dec. 9, 1986
Taddeo	4,837,837	June 6, 1989
Spear et al. (Spear)	5,373,564	Dec. 13, 1994 (filed Oct. 2, 1992)

Although claims 1-6 were rejected in the final Office action under § 103 for unpatentability over Bose in view of Taddeo and Weckler U.S. Patent 4,807,293, the examiner has withdrawn his reliance on Weckler (Answer at 4 and 9).

Claims 1-6, 9, and 10 stand rejected in the final Office action and the Answer under 35 U.S.C. § 112, first paragraph, as based on a non-enabling disclosure.

Claim 9 was additionally rejected for the first time in the Answer under § 102(e) as anticipated by Spear. Appellant responded by adding a new limitation to claim 9 and rewriting its dependent 10 in independent form. The examiner entered these amendments but does not consider the amendment of claim 9 sufficient to overcome the § 102(e) rejection.

D. The merits of the § 112 rejection of claims 1-6, 9, and 10

The examiner contends that the specification fails to teach a waveguide having a length corresponding to a quarter wavelength at the lowest frequency of pressure wave energy to be transmitted between the first and second ends, as required by each of the independent claims, i.e., claims 1, 9, and 10.² Specifically, the examiner argues that although the specification gives 70 Hz as typically the lowest bass frequency (Spec. at 3, lines 29-32³), it describes the quarter-wave mode as being "at a predetermined bass frequency, typically 80 Hz" (Spec. at 3, lines 5-6), which the examiner does not consider to be substantially the same as 70 Hz (Answer at 3, 8). It is not clear why the examiner believes this alleged contradiction raises a non-enablement issue, as he does not contend that one skilled in the art would have

² This requirement initially appeared in the claims and abstract as originally filed and therefore does not raise a question of noncompliance with the written description requirement of the first paragraph of § 112. See In re Wertheim, 541 F.2d 257, 264, 191 USPQ 90, 98 (CCPA 1976) (original claims constitute their own written description support).

³ These lines read "The bass spectral components from the other stereo channel may be summed and radiated by the invention, typically from 70 to 300 Hz."

been unable to make a loudspeaker system which satisfies the claim language without undue experimentation. In re Vaeck, 947 F.2d 488, 495, 20 USPQ2d 1438, 1444 (Fed. Cir. 1991). Instead, the examiner's concern appears to be that the claim language fails to describe what appellant actually regards as his invention, a matter which should have been raised in a rejection based on the second rather than the first paragraph of § 112. In any event, we agree with appellant that the claim language "effective length corresponding substantially to a quarter wavelength at the lowest frequency . . ." accurately describes the disclosed example. That is, bearing in mind that the bass range is described as being typically from 70 to 300 Hz, a quarter wavelength at 80 Hz corresponds substantially to a quarter wavelength at 70 Hz.

For the foregoing reasons, we are reversing the § 112 rejection as to all of the appealed claims.

E. The merits of the § 103 rejection of claims 1-6 over Bose in view of Taddeo

The level of skill in the art is represented by the Bose and Taddeo references. In re Oelrich, 579 F.2d 86, 91, 198 USPQ 210, 214 (CCPA 1978) ("the PTO usually must evaluate both

the scope and content of the prior art and the level of ordinary skill solely on the cold words of the literature"). In re GPAC, Inc., 57 F.3d 1573, 1579, 35 USPQ2d 1116, 1121 (Fed. Cir. 1995)(board did not err in adopting the approach that the level of skill in the art was best determined by the references of record).

Figure 1 of Bose shows an acoustic waveguide loudspeaker system which includes an electroacoustical transducer or driver 22. The back side of the transducer communicates with an opening 28 in front panel 16 of the loudspeaker housing via a folded rear tube or waveguide formed by internal vertical walls 21 and 23, internal horizontal walls 24-27 (26 is not labeled), right side panel 15, top panel 12, front panel 16, and rear panel 17. Bose's claim 1 specifies that the effective length of the rear tube is substantially equal to a quarter wavelength at the lowest frequency of pressure wave energy to be transmitted between first and second ends. Consequently, the preamble and the first two paragraphs of appellant's claim 1 read on Bose. Appellant does not contend otherwise. However, Bose lacks the claimed damping material in the waveguide. Bose explains that

[w]hile prior art approaches using acoustic transmission lines generally teach the use of sound absorbing material to minimize resonance phenomena in the tube, according to the present invention the tube is preferably hard and free of sound absorbing material to take advantage of the resonance phenomena in the acoustic transmission line to achieve improved impedance match and thereby improve power transfer between the loudspeaker driver and the environment outside the cabinet. [Emphasis added.] [Col. 3, lines 34-42.]

Taddeo, which shows a loudspeaker system having a shorter labyrinth passage, discloses that it is known to provide labyrinth speaker systems with

some form of damping or stuffing material for the damping of undesired sound waves. In some instances the damping material is simply in the form of a lining inside the housing; and in other cases the damping material is stuffed in the housing completely to block off certain portions thereof, such as for example portions of the labyrinth formed in a transmission line housing. Typical materials used in [the] past have been wool, fiberglass and polyester fibers. Foam materials have also been used.

The primary reasons for utilizing damping materials in such housings are twofold. First, the damping material is used to absorb unwanted higher frequency sounds, such as internal reflections and standing wave resonances between walls of the cabinet, and to the extent that the lower frequencies are attenuated to a much lower degree, the damping material therefore acts as a desirable low-pass filter. Secondly, the damping materials are used to reduce the necessary cabinet volume. In transmission line or labyrinth type enclosures, the

damping material also acts to reduce the speed of sound, thereby reducing the necessary line length and enclosure dimension. [Emphasis added.] [Col. 1, lines 39-62.]

Taddeo's invention is the use of goat's hair (mohair) instead of wool as the sound absorbing material (col. 2, lines 31-36). "Typically the goat's hair is stuffed in rather large quantities, as compared to the wool heretofore employed, in a portion of the speaker labyrinth to interpose the goat's hair stuffing between the speaker or driver and the outlet end of the labyrinth" (col. 2, lines 36-40). Taddeo's Figure 2 shows an embodiment in which the mohair is located at one of the two U-shaped bends in the labyrinth passage about midway between transducer 12 and opening 13. This figure is described as follows at column 4, lines 4-10: "In order to dampen undesirable sound waves in housing 10, the labyrinth, which is formed in the housing by the partitions 15, 18, 19 between the driver 12 and the port 13, is partially stuffed or filled as at 20 in FIG. 2 with mohair fibers up to the level L. Thus, sound waves emanating from the speaker 12 must pass through the mohair filling 20 before reaching port 13."

The examiner's position (Answer at 5) is that

it would have been obvious . . . to apply Taddeo's teaching of damping material near the vibratile surface to Bose's loudspeaker system to perform no more than its intended function[,] which is to absorb unwanted higher frequency sounds, and to attenuate the lower frequency sounds to a much lower degree (see column 1, lines 51-52 and 54-56 of Taddeo).

As explained in In re Rouffet, 149 F.3d 1350, 1355, 47 USPQ2d 1453, 1455 (Fed. Cir. 1998),

[t]o reject claims in an application under section 103, an examiner must show an unrebutted prima facie case of obviousness. See In re Deuel, 51 F.3d 1552, 1557, 34 USPQ2d 1210, 1214 (Fed. Cir. 1995). In the absence of a proper prima facie case of obviousness, an applicant who complies with the other statutory requirements is entitled to a patent. See In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). On appeal to the Board, an applicant can overcome a rejection by showing insufficient evidence of prima facie obviousness or by rebutting the prima facie case with evidence of secondary indicia of nonobviousness. See id.

Appellant does not dispute the obviousness of using Taddeo's damping material 20, i.e., mohair, in Bose's waveguide or deny that mohair will absorb unwanted higher frequency sound and attenuate lower frequencies to a much lower degree. Instead, appellant argues (Opening brief at 7) that Taddeo

Appeal No. 1996-1891
Application 08/058,478

discloses locating damping material 20 far from the vibratile diaphragm. That is hardly a teaching of locating the damping material near the vibratile diaphragm in a waveguide speaker as disclosed and claimed in this application. [Appellant's] FIGS. 1, 2 and 4 clearly disclose [that] the damping material 14, 24, 24' in the waveguide is near the vibratile surface at the driver end of the waveguide" [Emphasis added.]

Appellant further notes that his specification explains that

[bly locating the polyester damping material 24 at the driver end as shown, the velocity is low at low frequencies, and the damping material negligibly attenuates bass frequency energy. However, at higher frequencies, shorter wavelengths, the velocity is higher, and the damping material 24 damps these higher frequency peaks as shown in FIG. 3 with a single block of damping material as shown. [Spec. at 2, lines 19-25.]

We do not agree that Taddeo teaches that the damping material must be located far from the vibratile surface, as appellant contends. Taddeo does not explain where along the length of the waveguide the damping material should be located; it is only necessary that, as explained in Taddeo's claim 1, the mohair fibers be "positioned in said housing and operatively filling a portion of said labyrinth to a level such that all sound waves emanating from said loudspeaker must pass through said mohair fibers before reaching said other opening." While this result is accomplished in Taddeo's Figure 2 system by

locating the damping material in the U-shaped turn that opens upward, Taddeo does not indicate that this is the only suitable location for the damping material. Consequently, we are of the opinion that one skilled in the art would have understood Taddeo to be teaching that the mohair can be located anywhere along the length of the waveguide, provided it completely fills the cross-sectional area of a portion of the waveguide without interfering with the transducer or the open end of the waveguide. Thus, it would have been prima facie obvious to position Taddeo's mohair damping material anywhere along the length of Bose's waveguide, e.g., in the portion of the waveguide closest to the transducer or at the U-shaped turn that is closest to the transducer. To the extent appellant is arguing that the prima facie case is rebutted by the fact that his invention, by locating the damping material only near the transducer, achieves unexpectedly good results, we are unpersuaded, for two reasons. The first is that this argument is not commensurate in scope with the claim, which does not require that the damping material be located only near the transducer. The second reason is the record before us, including appellant's

specification, does not provide any data which compares the results of locating the damping material only near the transducer with the results of locating the damping material elsewhere in the waveguide. Instead, appellant's Figure 3 compares the results of locating the damping material only near the transducer (heavy trace) with the results of employing no damping material anywhere in the waveguide (thin trace) (Spec. at 2, lines 7-12). Compare Richardson-Vicks, Inc. v. Upjohn Co., 122 F.3d 1476, 1483, 44 USPQ2d 1181, 1186 (Fed. Cir. 1997) ("the PTO must consider comparative data in the specification in determining whether the claimed invention provides unexpected results") (emphasis omitted) (quoting In re Soni, 54 F.3d 746, 750, 34 USPQ2d 1684, 1687 (Fed. Cir. 1995)).

For the foregoing reasons, we will affirm the § 103 rejection of claim 1 based on Bose in view of Taddeo. The rejection of claims 2 and 3, which are not separately argued, is also affirmed. In re Nielson, 816 F.2d 1567, 1572, 2 USPQ2d 1525, 1528 (Fed. Cir. 1987).

Dependent claims 4-6 are separately argued. Claim 4 specifies that the first of the waveguide portions near the

vibratile surface is substantially filled with the damping material. As explained above, we are of the opinion that it would have been prima facie obvious to locate Taddeo's damping material in a region of Bose's waveguide which begins near the transducer, which will satisfy this claim. For the same reason, we are affirming the rejection of claim 6, which specifies that a volume of the waveguide nearest the vibratile surface is substantially filled with the damping material.

Claim 5 specifies that the last of the waveguide portions is separated from a first group of the waveguide portions by a second group of waveguide portions formed by waveguide walls generally perpendicular to the vibratile surface. The examiner describes Bose as disclosing

an acoustic waveguide having a last portion (the portion containing walls 12 and 27) of the waveguide portions . . . separated from a first of the waveguide portions (the portion bounded by walls 21, 24, 23 and 15) by a second group of the waveguide portions (the areas 16 and 17 [sic,⁴ the waveguide portion bounded by walls 24 and 25 and the waveguide portion bounded by walls 25 and 26]) formed by the

⁴ As noted supra, numerals 16 and 17 refer to the front and rear panels, respectively.

Appeal No. 1996-1891
Application 08/058,478

waveguide walls generally parallel to the vibratile surface. [Answer at 6.]

As appellant correctly notes, these waveguide portions are formed by walls that are perpendicular to the vibratile surface, not parallel thereto as argued by the examiner. Consequently, the rejection of claim 5 is reversed.

Claim 9 stands rejected under § 102(e) as anticipated by Spear. This claim calls for, inter alia, (a) the waveguide to have "damping material in said waveguide at said driver end extending into said waveguide for a predetermined length near said vibratile surface" and (b) "the length of said waveguide between said first end and said damping material [to be] significantly greater than said predetermined length." These limitations clearly require that the damping material not fill the entire waveguide. As appellant correctly notes, Spear's damping material fills the entire waveguide. See column 3, lines 18-20: "The housing is completed by respective top and bottom walls E--E as shown. Normal standing wave modes that freely arise along the entire height of the line are damped conventionally by placing symbolized fibrous materials

Appeal No. 1996-1891
Application 08/058,478

throughout the housing from top to bottom." The band width is determined by the packing density of the material:

When the line is stuffed with fibers, the band of frequencies passed by the opening can be broadened and shifted depending on the amount of fiber stuffing and also on the cross-sectional area of the passage. Generally speaking, a passage with low stuffing densities and large cross-sectional area will produce a wider band width and have lower bass extension and greater amplitude. Passages with higher stuffing densities and small cross sectional area will produce a narrower band width with reduced low bass and lower amplitude, but with improved transient response.
[Spear, col. 4, lines 9-20.]

For the foregoing reasons, we are reversing the rejection of claim 9. We note that claim 9 further specifies that the waveguide comprises a first set of parallel waveguide walls generally perpendicular to the vibratile surface and a second set of parallel waveguide walls generally parallel to the vibratile surface. Appellant does not dispute the examiner's reliance on Spear's horizontal walls 16 to satisfy the requirement for a first set of parallel waveguide walls generally perpendicular to the vibratile surface. However, appellant does take issue with the examiner's reliance on the parts of side walls 20 and 28 that are located between angled

Appeal No. 1996-1891
Application 08/058,478

portions 24 to satisfy the requirement for a second set of parallel waveguide walls generally parallel to the vibratile surface. However, we do not agree with appellant that the claim language precludes the presence of these angled portions.

Appeal No. 1996-1891
Application 08/058,478

No time period for taking any subsequent action in
connection with this appeal may be extended under 37 CFR
§ 1.136(a).

AFFIRMED-IN-PART

)	
ERROL A. KRASS)	
Administrative Patent Judge)	
)	
)	
)	BOARD OF PATENT
JOHN C. MARTIN)	
Administrative Patent Judge)	APPEALS AND
)	
)	INTERFERENCES
)	
ANITA PELLMAN GROSS)	
Administrative Patent Judge)	

Appeal No. 1996-1891
Application 08/058,478

cc:

Charles Hieken, Esq.
FISH & RICHARDSON
225 Franklin Street
Boston, MA 02110-2804

JCM/cam